

# **Development of A Mobile Tax System With Usability Features**

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## **ABSTRACT**

Mobile taxing (m-taxing) comprises the concept of utilizing mobile devices to carry out the task of filing income tax returns with the Internal Revenue Service (IRS). M-taxing is limited to a 3G, EDGE (2.5G), and Wi-Fi network and is targeted towards a mobile device that has a full access keypad and wide display screen. This research paper develops a m-taxing system with usability features. Specifically, it first outlines the characteristics of the system, and then develops a conceptual model to illustrate how each process and data flow needed to achieve a user friendly m-taxing system. Second, each data flow is decomposed for further conception by the reader and is given a set of usability features that provides the system to be user friendly. This research will benefit the m-tax system developers.

**Keywords :** mobile taxing, usability features

## **1. INTRODUCTION**

Electronic commerce is a transaction process administered via computer networks (Stafford & Gillenson, 2003). A past study reported that the IRS had an aim of getting 80% of the tax returns filed electronically by the year of 2007 (Froomkin, 1997). Over the past few years people have become more dependent on their mobile devices, using them to pay bills, purchase plane tickets and amongst many other things. Mobile commerce takes this process a step further, enabling users to access applications and services via an internet enabled mobile device (Venkatesh & Massey, 2003).

As people become increasingly busier, they are also becoming more reliable on a mobile means of doing everyday activities, such as filing their taxes. Whereas having an online option for filing taxes was the technology of yesterday, the option of filing through a mobile device is the technology of tomorrow. To keep on the front edge of this emerging demand for mobile information systems, the need for an m-tax system must be met.

### ***1.1 Descriptions of the M-Taxing System***

The components of the Mobile Tax System (m-tax system) will be comprised of an internet enabled mobile device (such as a cell phone, handheld computer, or personal digital assistant), the mobile tax software, the input of personal data, procedures to find the refund allotted to the tax payer or taxes owed to the IRS, and the users and programmers that will enable this technology to become a reality. The components in the m-tax system are interrelated in a way that the software cannot be used without an internet enabled mobile device, and the calculations cannot be performed without the user's input of their personal tax information.

The boundary of this system will be the user's input of the required data, the calculation of the refund or taxes owed to the IRS, and the sending of the completed forms to the IRS. The constraints of this system will be limited to the ability of the mobile device such as the screen size and resolution, and the use of the mobile device's keypad as a means of entering data.

The purpose of the m-tax system will be to facilitate the use of mobile devices in order to allow users to perform this yearly ritual in a more timely and convenient manner. With third generation (3G), second and a half generation (2.5G), and Wireless Fidelity (Wi-Fi) internet capabilities becoming an everyday aspect of life, the users' demand for the ability to perform activities such as this will begin to rise.

The environment of the m-tax system includes everything that influences the system that is outside the system's boundaries. The user will need the required forms such as their W-2s in order to have the required information to input in order to file their taxes. After the user has entered the necessary input, the system will be required to send this data to the Internal Revenue Service (IRS) for verification and confirmation of retrieval. The need for this outside information and organization enables the need for the disbursement of W-2s by the user's place of employment and the IRS to be part of the system's external environment.

The interface of the m-tax system will be where the system meets its environment. This will include a user-friendly interface that will be easily compatible with all mobile devices. With an e-tax system, the interface contains numerous features for users to access. However, intricate interfaces pose a large problem in the usability of a mobile system due to the limitations of the screen size and its resolution. Studies have shown that the relevance of the content is perceived as a greater importance on a wireless system than a web-based system. Ease of use and made-for-the-medium also ranked high with wireless users. This made-for-the-medium idea goes beyond shrinking web pages down to the accessibility of a mobile device (Venkatesh & Massey, 2003). The idea is to devise an application made strictly for mobile use. The design of the m-tax software will rely on cutting back on cumbersome features in order to provide users with a system that will allow them to access different information and pages while using little effort.

The m-tax interface will be straight forward, user-friendly, and easily accessed and should have an aesthetic result from the colors and layout utilized by the m-taxing software from the small screen that a mobile device entails (Economides, 2008) viewed.

The input of the system will come from the user. The user will enter in the necessary data that is required by the IRS in order to compute a refund or amount owed back to the IRS. This input will include, but not be limited to, a username and password for security, personal information such as the user's name and address, the user's social security number, the required input from the user's W-2, and the user's banking information if the option of direct deposit is selected. The output of the system will be the computed figure of the IRS refund or amount owed, email verification, and an email confirmation that the data has been received by the IRS. It is mandatory by law for the IRS and other tax filing websites to acknowledge the receipt of the taxpayer. If there is no receipt (i.e., confirmation number) given, this signifies that the customer's taxes were not properly filed (Sharma, 2006).

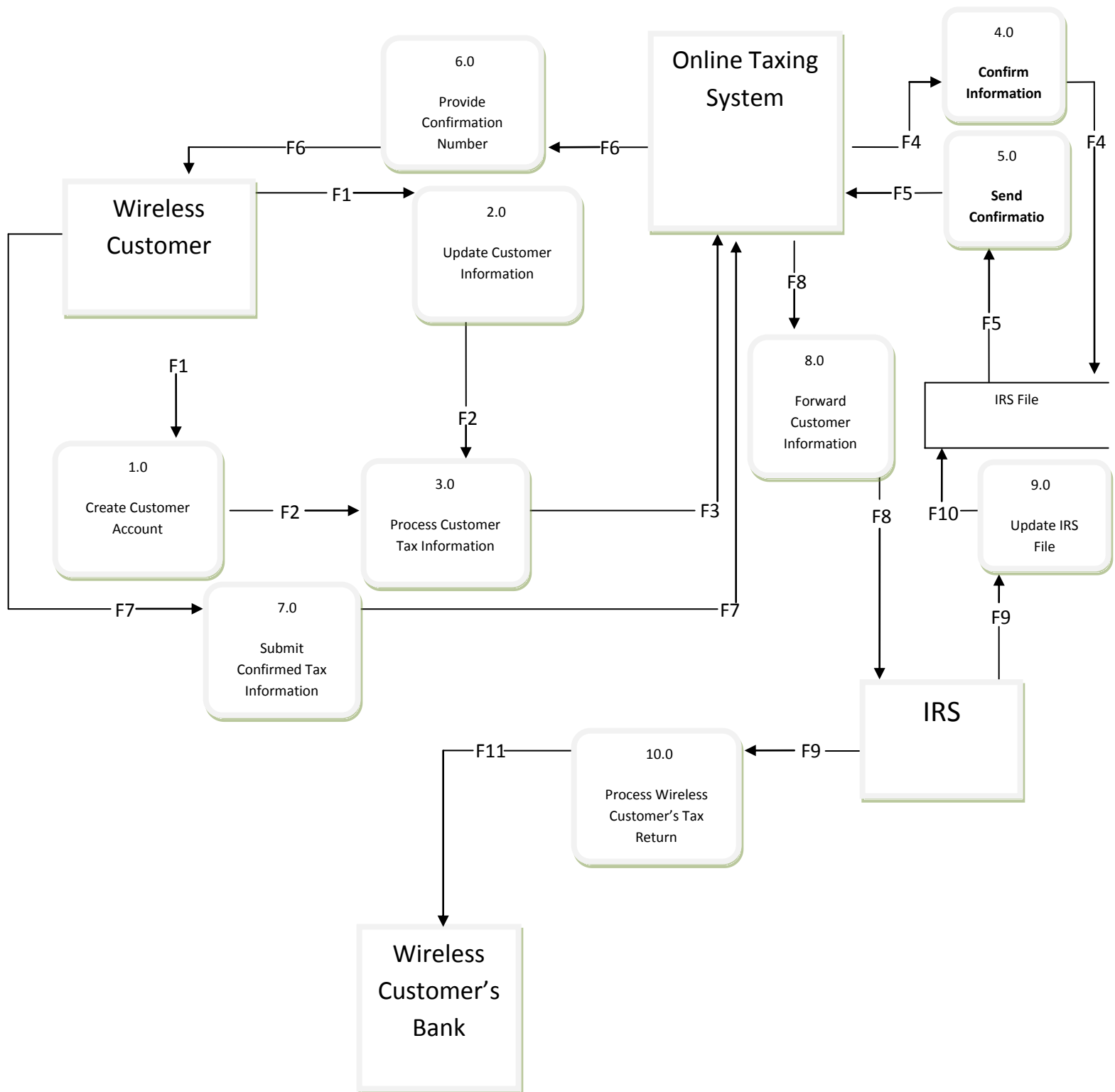
Since the use of m-tax will require the input of personal data such as social security numbers, the security features will also be an important aspect of the m-tax software. Noted in a recent study, users tend to aggressively look for a privacy policy on e-taxing websites to insure that their personal information is safe. Since the m-taxing system is a progressive modification of an e-tax system, it then becomes a critical aspect of the m-taxing software (Fogg, 2002). With mobile device's connecting to internet via capabilities such as 3G, 2.5G, and Wi-Fi, the need for encryption as a security measure will be vital (Whitten, 1999). SSL is to be deployed while utilizing the software and internet connection so that the sender and the intended receiver can only read the transmission. Usability studies have showed that users become more confident about the security of the system when they see visible signs of security (Sharma, 2006). So just having and exercising security mechanisms isn't enough, you have to advertise them as well (Economides, 2008). Simply stated, if the customer doesn't view the software as secure, they won't use it. A security enabled and maintained system is also a key for trust building between the systems and its customers (Wenhong & Najdawi, 2004).

There are also certain specifications of the mobile device that are required in order to implement the m-tax system. The technology must be either 3G, 2.5G, or Bluetooth Wireless. The mobile device is required to have the ability for real web browsing (HTML) or be Wi-Fi enabled. The user must have access to mobile email in order to receive updates sent by the online taxing system. The mobile device's battery capacity must be 1100 mAH with a minimum talk time of four hours and a standby time of up to seven days. Lastly, the minimal resolution must be greater than or equal to 320 x 420 with 65k colors and the system requires a QWERTY keyboard. Examples of mobile devices that fit these specifications are the iPhone, Blackberry Smartphones, T-Mobile's Sidekick, and the Google G1.

## **2. M-TAXING CONCEPTUAL MODEL DEVELOPMENT**

A conceptual model includes all the requirements needed for the new system. Figure 1 illustrates the conceptual model for the m-tax system. This model includes ten processes, one data store, four sources/sinks, and eleven information flows. Table 1 presents the descriptions of 11

information flows in the m-tax system. Table 2 presents the description of each information flow in terms of its usability feature.



**Figure 1: Conceptual Model for M-Tax System**

Flow	Flow Name	Feature
<b>F1</b>	<b>Customer Account</b>	<b>F1a:</b> Successful Access of the system
		<b>F1b:</b> Remember user name and password for later access and logons
		<b>F1c:</b> Offer of other services; such as corporate tax services and products to educate users on tax facts
		<b>F1d:</b> User friendly interface that is professionally designed and has an easy and logical flow
<b>F2</b>	<b>Customer Insertion of Tax Information</b>	<b>F2a:</b> Language Selection allowing users to convert language on the system to be changed to their first language
		<b>F2b:</b> Income Statement Demo showing system users of what an accurately filled out form looks like
		<b>F2c:</b> Help option; allows users to access information on specific fields in forms
		<b>F2d:</b> FAQ Section; allows users to view commonly asked questions about income tax returns
		<b>F2e:</b> Promotional Offers; gives users the option to access links to other reliable sources for promotional offers pertaining to tax and savings information
		<b>F2f:</b> Pop-Up Blocker; doesn't allow any pop-ups on the website while the user is entering their income tax information( besides processing splash screen)
<b>F3</b>	<b>Customer Confirmation</b>	<b>F3a:</b> Security; provides a detailed section describing all security measures that have been taken to protect customer information
		<b>F3b:</b> Processing Time; presented as the only accepted pop-up which provides the customer with the amount of time it takes for the system to process their information
		<b>F3c:</b> Warning against errors in form and the extent of measures taken against offenders
		<b>F3d:</b> Policy of System is listed including all of the guidelines and standards that the online taxing system follows
<b>F4</b>	<b>System Confirmation</b>	<b>F4a:</b> Processing Time
<b>F5</b>	<b>IRS Confirmation</b>	<b>F5a:</b> Processing Time
<b>F6</b>	<b>Income Tax Return Notice</b>	<b>F6a:</b> Currency converter; when mobile user receives their estimated return or fee that is due, they are given the option of converting the given amount into their currency of choice
		<b>F6b:</b> Timeline on retrieval of return showing the date of expected deposit to the mobile user's account
		<b>F6c:</b> Quick download time
<b>F7</b>	<b>Customer Submission</b>	<b>F7a:</b> Confirmation/Submission number
		<b>F7b:</b> Print and E-Mail option of the confirmation number
		<b>F7c:</b> Payment of fee
		<b>F7d:</b> Payment options available for processing income tax

		information that can be paid by way of credit, check number or debit
<b>F8</b>	<b>System Submission</b>	<b>F8a:</b> Physical Address of Tax System; provides the address of the headquarters (or local) office
		<b>F8b:</b> Contact Phone Number
		<b>F8c:</b> Contact E-Mail
<b>F9</b>	<b>IRS Processing</b>	<b>F9a:</b> E-Mail update on processing phase
<b>F10</b>	<b>IRS File Update</b>	<b>F10a:</b> E-Mail update on file update
<b>F11</b>	<b>Income Tax Return</b>	<b>F11a:</b> Archival search; allows mobile user to access their submitted information at any time, even after direct deposit.
		<b>F11b:</b> E-mail update on direct deposit from IRS

**Table 1: Information Flow Descriptions**

<b>Flow</b>	<b>Flow Name</b>	<b>Description</b>
<b>F1</b>	<b>Customer Account</b>	<b>Flow 1</b> allows the mobile customer to access the online taxing system where they can then go on to create an account or to update their account information.
<b>F2</b>	<b>Customer Insertion of Tax Information</b>	<b>Flow 2</b> allows the mobile customer, upon completion of updating and creating an account with the online taxing system, to proceed onto entering their income tax information.
<b>F3</b>	<b>Customer Confirmation</b>	<b>Flow 3</b> allows the mobile customer, upon completion of entering all required income tax information to confirm with the online taxing system that the information entered was correct.
<b>F4</b>	<b>System Confirmation</b>	<b>Flow 4</b> allows the online taxing system to access the IRS file/database that holds the mobile customer's income tax information and compare the submitted information received from the mobile customer against the information on file.
<b>F5</b>	<b>IRS Confirmation</b>	<b>Flow 5</b> allows the IRS to send confirmation of correct information to the online taxing system.
<b>F6</b>	<b>Income Tax Return Notice</b>	<b>Flow 6</b> allows the online taxing system to present to the mobile customer, their expected tax return amount or dues owed to the IRS.
<b>F7</b>	<b>Customer Submission</b>	<b>Flow 7</b> allows the mobile customer to submit their income tax information to the online taxing system.
<b>F8</b>	<b>System Submission</b>	<b>Flow 8</b> allows the online system to forward the submitted income tax information to the IRS for processing.
<b>F9</b>	<b>IRS Processing</b>	<b>Flow 9</b> allows the IRS to process the forwarded income tax information.

<b>F10</b>	<b>IRS File Update</b>	<b>Flow 10</b> allows the IRS to update their IRS File and clear the mobile user (tax user) of any paperwork owed.
<b>F11</b>	<b>Income Tax Return</b>	<b>Flow 11</b> allows the IRS to directly deposit the mobile user's (tax payer's) bank.

**Table 2: Usability Feature Descriptions**

### 3. METHODOLOGY

A Gantt chart was developed at the beginning of this project for system planning by using Microsoft Project. Though the criteria of a taxing system seem to be inconsistent amongst its users and depends on a number of variables, this paper focuses on developing a set of features based on usability. These features were further mapped into a questionnaire to quantitatively measure users' preferences on m-taxing system. Table 3 presents the Mobile Tax System Questionnaire that used to collect users' data.

#### 3.1 M-Tax System Analysis

Data was collected from subject matter experts. Based on the data collection, the most important features were selected for development. These most important features are those in Table 3 with average score higher than 4.0.

How much do you agree with the following features that adds usability feature to the m-taxing?			
1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree			
Flow	Flow Name	Feature	Score
<b>F1</b>	<b>Customer Account</b>	<b>F1a:</b> Successful access of the system	
		<b>F1b:</b> Remember user name and password for later access and logons	
		<b>F1c:</b> Offer of other services; such as corporate tax services and products to educate users on tax facts	
		<b>F1d:</b> User friendly interface that is professionally designed and has an easy and logical flow	
<b>F2</b>	<b>Customer Insertion of Tax Information</b>	<b>F2a:</b> Language Selection allowing users to convert language on the system to be changed to their first language	
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		<b>F2c:</b> Help option; allows users to access information on	

		specific fields in forms	
		<b>F2d:</b> FAQ Section; allows users to view commonly asked questions about income tax returns	
		<b>F2e:</b> Promotional Offers; gives users the option to access links to other reliable sources for promotional offers pertaining to tax and savings information	
		<b>F2f:</b> Pop-Up Blocker; doesn't allow any pop-ups on the website while the user is entering their income tax information (besides processing splash screen)	
<b>F3</b>	<b>Customer Confirmation</b>	<b>F3a:</b> Security; provides a detailed section describing all security measures that have been taken to protect customer information	
		<b>F3b:</b> Processing Time; presented as the only accepted pop-up which provides the customer with the amount of time it takes for the system to process their information	
		<b>F3c:</b> Warning against errors in form and the extent of measures taken against offenders	
		<b>F3d:</b> Policy of System is listed including all of the guidelines and standards that the online taxing system follows	
<b>F4</b>	<b>System Confirmation</b>	<b>F4a:</b> Real-time entry of data	
<b>F5</b>	<b>IRS Confirmation</b>	<b>F5a:</b> Real-time entry of data	
<b>F6</b>	<b>Income Tax Return Notice</b>	<b>F6a:</b> Currency converter; when mobile user receives their estimated return or fee that is due, they are given the option of converting the given amount into their currency of choice	
		<b>F6b:</b> Timeline on retrieval of return showing the date of expected deposit to the mobile user's account	
		<b>F6c:</b> Quick download time	
<b>F7</b>	<b>Customer Submission</b>	<b>F7a:</b> Confirmation/Submission number	
		<b>F7b:</b> Print and E-Mail option of the confirmation number	
		<b>F7c:</b> Payment of fee	
		<b>F7d:</b> Payment options available for processing income tax information that can be paid by way of credit, check number or debit	
<b>F8</b>	<b>System Submission</b>	<b>F8a:</b> Physical Address of Tax System; provides the address of the headquarters (or local) office	
		<b>F8b:</b> Contact Phone Number	
		<b>F8c:</b> Contact E-Mail	
<b>F9</b>	<b>IRS Processing</b>	<b>F9a:</b> E-Mail update on processing phase	
<b>F10</b>	<b>IRS File</b>	<b>F10a:</b> E-Mail update on file update	



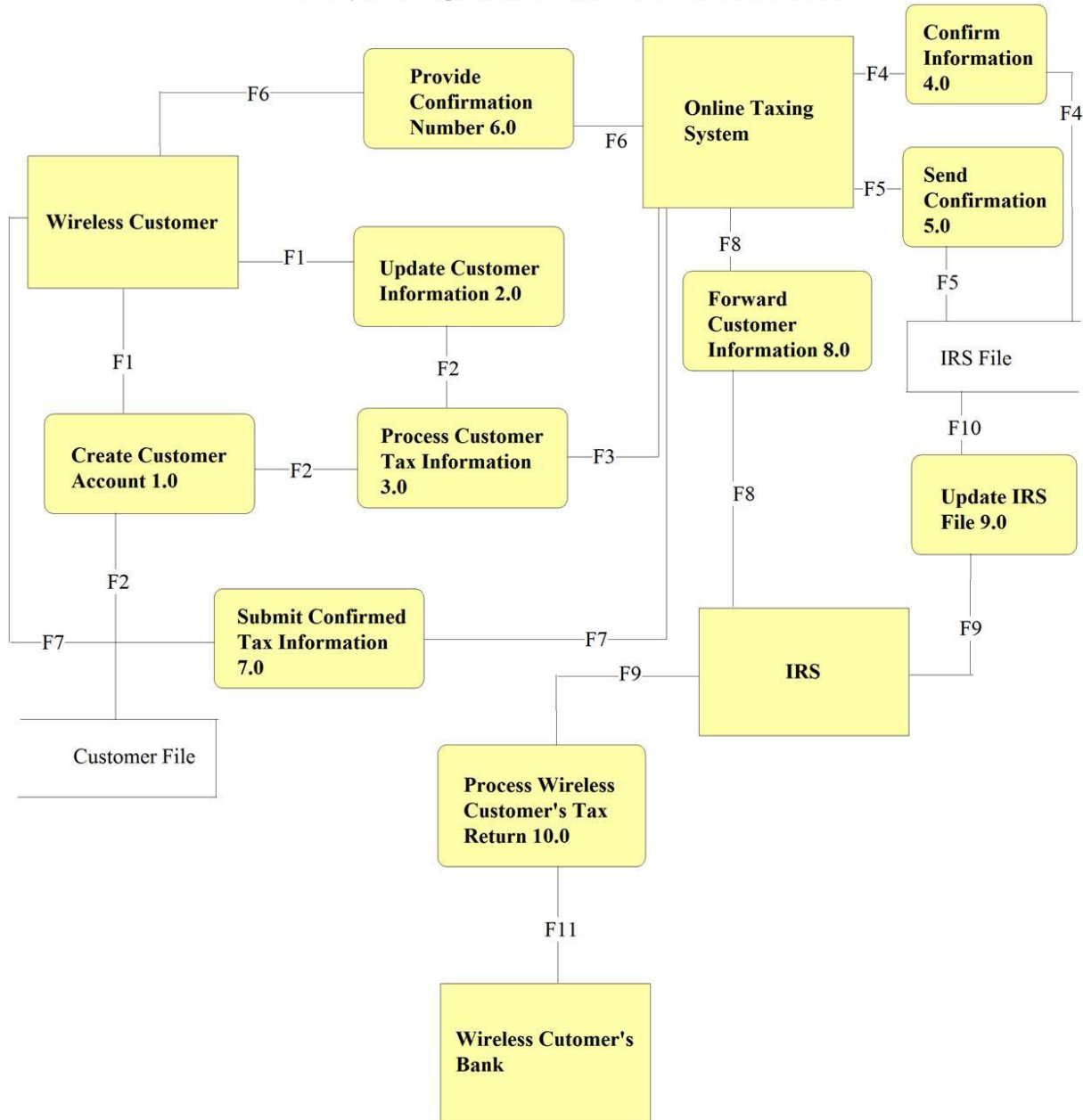
	<b>Update</b>		
<b>F11</b>	<b>Income Tax Return</b>	<b>F11a:</b> Archival search; allows mobile user to access their submitted information at any time, even after direct deposit	
		<b>F11b:</b> E-mail update on direct deposit from IRS	

**Table 3. Mobile Tax System Questionnaire**

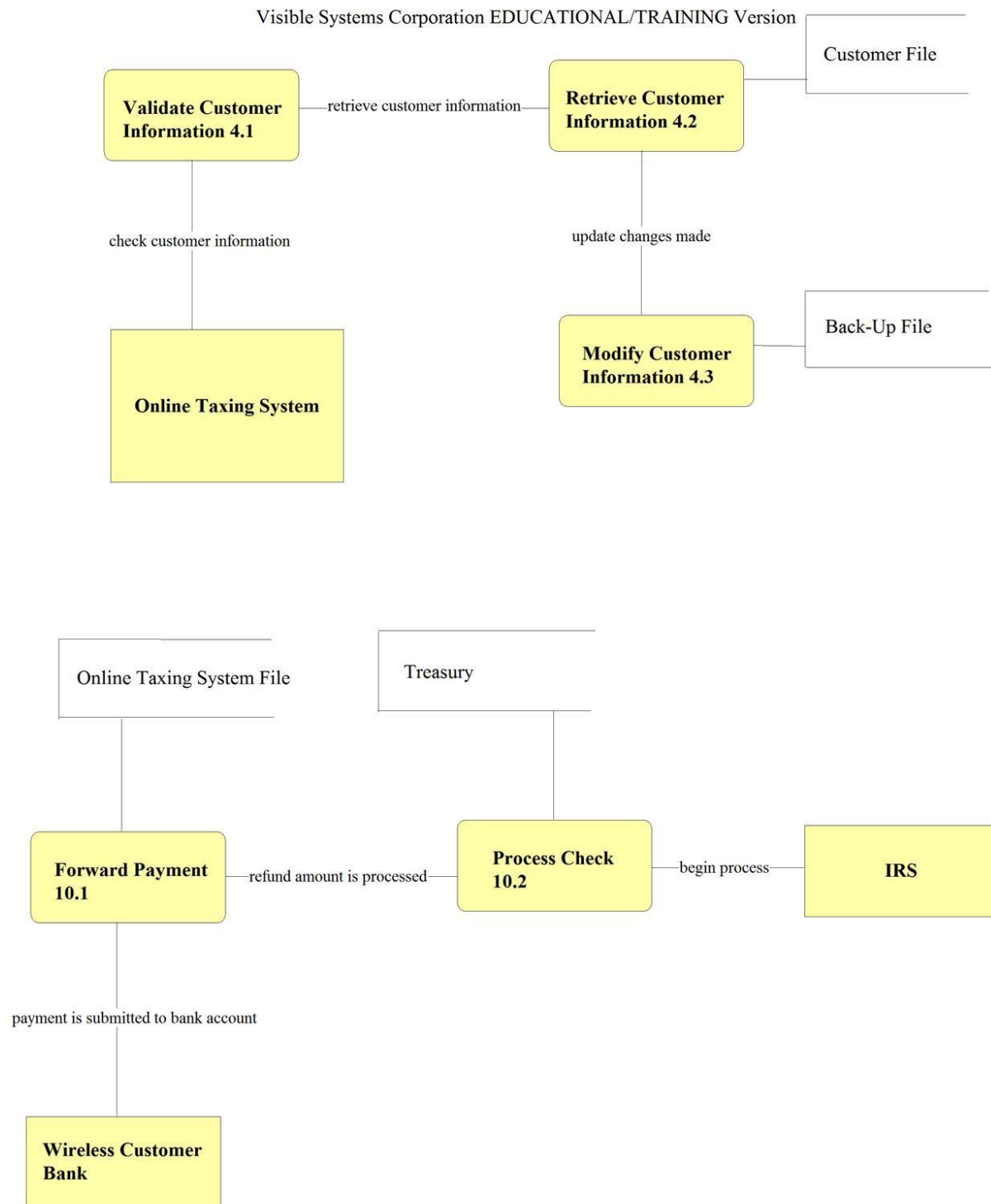
After requirements collection, the system analysis uses two techniques, processing modeling using data flow diagram and data modeling using entity-relationship diagram.

### ***3.1.1 Process Modeling – Data Flow Diagram Using Visible Analyst***

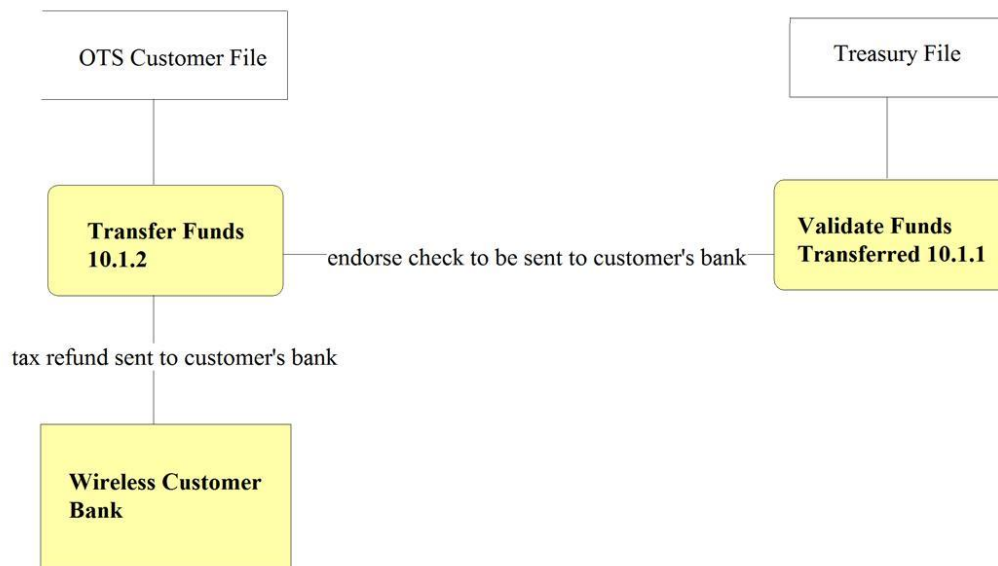
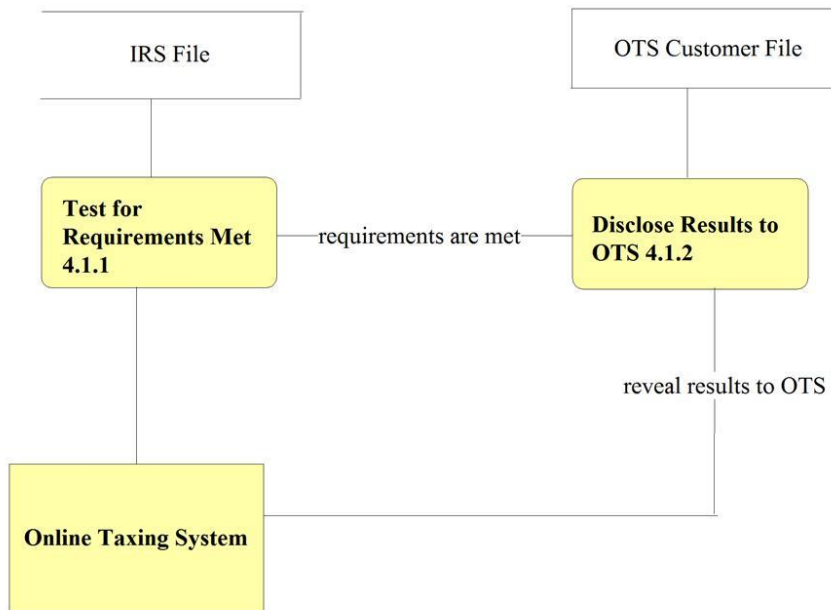
The Data Flow Diagram (DFD) for the m-tax system consists of two data stores, ten processes, four source/sink, and eleven data flows. This diagram is illustrated in Figure 2. The two processes, 4.0 Confirm Information and 10.0 Process Wireless Customer's Tax Return, are decomposed and shown in Figure 3. The Level-1 DFD contains two data stores, three processes, and one source for 4.0 Confirm Information. Decomposition for the following processes occurred because each process can be carried out by more than one process. The Level-1 DFD contains two data stores, two processes, and two source/sink for 10.0 Process Wireless Customer's Tax Return. Figure 4 illustrates the Level-2 DFD of the further decomposed processes that were utilized in Figure 3, which are processes 4.1 Validate Customer Information and 10.1 Forward Payment. Both consist of two data stores, two processes, and one source/sink.



**Figure 2: Level-0 Data Flow Diagram**



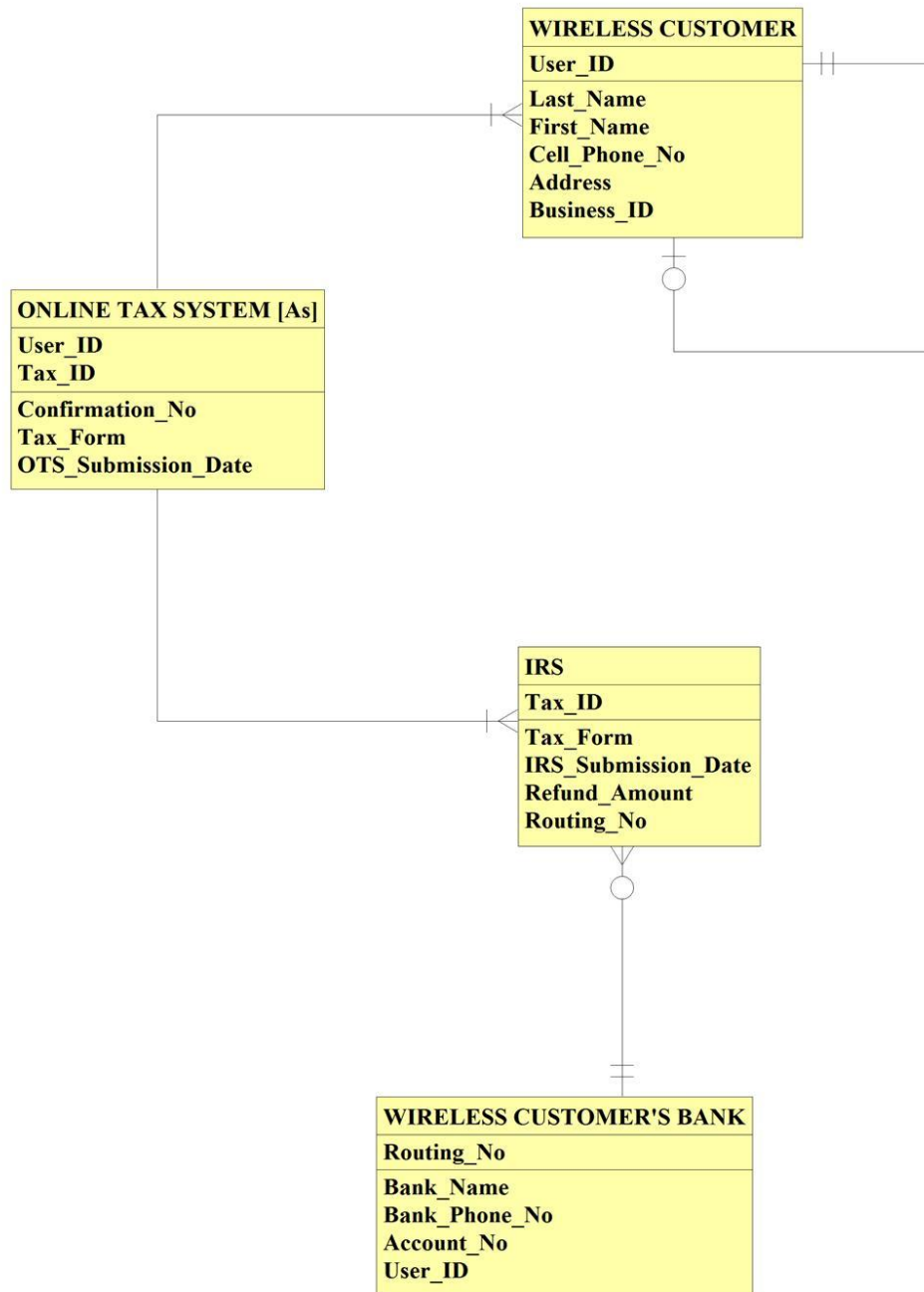
**Figure 3: Level-1 Data Flow Diagrams**



**Figure 4: Level-2 Data Flow Diagrams**

### ***3.1.2 Data Modeling – Entity-Relationship Diagram Using Visible Analyst***

The Entity-Relationship (E-R) Diagram for the m-tax system consists of three entities, one associative entity and four types of cardinalities. These cardinalities include: mandatory 1, mandatory many, optional many, optional 0 or 1, and optional 0 to many. WIRELESS CUSTOMER, IRS, and WIRELESS CUSTOMER'S BANK are entities in the diagram while ONLINE TAX SYSTEM represents the associative entity. Figure 5 illustrates the E-R Diagram for the m-tax system. There assumptions associated with the E-R Diagram. A WIRELESS CUSTOMER may contain one and only one Business\_ID. A WIRELESS CUSTOMER may contain zero to one Business\_ID. ONLINE TAX SYSTEM is an associative relationship between WIRELESS CUSTOMER and IRS. IRS processes one and only one refund to WIRELESS CUSTOMER'S BANK. WIRELESS CUSTOMER'S BANK can process zero to many refunds.



**Figure 5: Entity-Relationship Diagram**

### 3.2 M-Tax System Design

M-taxing system design includes two aspects, database design and user interface design.

#### 3.2.1 Database Design Using Microsoft Access

The E-R Diagram is used as way to map tables for the database. The database for the m-tax system, created Microsoft Access, consists of four tables, two forms, two queries, and one report. Each entity along with the associate entity from the E-R Diagram represents tables in the database. The primary key of each entity becomes the primary key of the corresponding relation. For example, since User\_ID is the primary key of the WIRELESS CUSTOMER entity, it's the primary key of the WIRELESS CUSTOMER table also. Since ONLINE TAX SYSTEM is an associative entity of WIRELESS CUSTOMER and IRS, the primary keys of the later two become the composite primary key for the ONLINE TAX SYSTEM table. Figure 6 presents the tables of the m-tax system. Forms for the Wireless Customer and Wireless Customer's Bank tables were created. Figure 7 presents the forms of the m-tax system. The following questions are answered by the queries. Which users use Form 1040? Which uses submitted their tax return to the Online Tax System before April 2008? Figures 8-9 present the queries of the m-tax system. The report consists of the Wireless Customer's information and is presented by Figure 10.

Wireless Customer Table

WIRELESS CUSTOMER								12/1/2008
User_ID	Last_Name	First_Name	Cell_Phone_No	Street	City	State	Business_ID	
1001	Williams	Bryan	(850) 894-6515	343 Davis Street	Pensacola	FL	2001	
1002	Robinson	Lisa	(850) 549-6187	846 Nine Ave.	Pensacola	FL	2002	
1003	Johnson	Bob	(850) 613-6519	648 St. Clair Blvd.	Pensacola	FL	2003	
1004	Washington	Donita	(850) 319-6916	874 Main Street	Pensacola	FL	2004	

Online Tax System Table

ONLINE TAX SYSTEM					12/1/2008
User_ID	Tax_ID	Confirmation_No	Tax_Form	OTS_Submission_Date	
1001	3001	T18595154871	Form 1040	03/13/2008	
1002	3002	T2814951487	Form W-4	02/28/2008	
1003	3003	T3413947944	Form 1040	02/17/2008	
1004	3004	T4845168848	Form 1040	04/07/2008	

## Wireless Customer's Bank Table

IRS

12/1/2008

Tax_ID	Tax_Form	IRS_Submission_Date	Refund_Amount	Routing_No
3001	Form 1040	03/15/2008	\$1,964.00	4001
3002	Form W-4	03/02/2008	\$2,648.00	4002
3003	Form 1040	02/22/2008	\$854.00	4003
3004	Form 1040	04/10/2008	\$1,250.00	4004

**Figure 6 M-Taxing Tables**



## Wireless Customer

User_ID	1001
Last_Name	Williams
First_Name	Bryan
Cell_Phone_No	(850) 894-6515
Street	343 Davis Street
City	Pensacola
State	FL

User_ID	1002
Last_Name	Robinson
First_Name	Lisa
Cell_Phone_No	(850) 549-6187
Street	846 Nine Ave.
City	Pensacola
State	FL

User_ID	1003
Last_Name	Johnson
First_Name	Bob
Cell_Phone_No	(850) 613-6519
Street	648 St. Clair Blvd.
City	Pensacola

State	FL
User_ID	1004
Last_Name	Washington
First_Name	Donita
Cell_Phone_No	(850) 319-6916
Street	874 Main Street
City	Pensacola
State	FL

## Wireless Customer's Bank

Routing_No	4001
Bank_Name	Pen Air Federal Credit Union
Bank_Phone_No	(850) 505-3200
Account_No	5198954
User_ID	1001

Routing_No	4002
Bank_Name	Members First Credit Union of FL
Bank_Phone_No	(850) 434-2211
Account_No	8451574
User_ID	1002

Routing_No	4003
Bank_Name	Members First Credit Union of FL
Bank_Phone_No	(850) 434-2211
Account_No	9841515
User_ID	1003

Routing_No	4004
Bank_Name	Pen Air Federal Credit Union
Bank_Phone_No	(850) 505-3200
Account_No	4819154
User_ID	1004

**Figure 7: M-Taxing Forms**

Users with Form 1040

User_ID	First_Name	Last_Name
1001	Bryan	Williams
1003	Bob	Johnson
1004	Donita	Washington

Figure 8: Users with Form 1040 Query

Submitted to OTS before April

User_ID	OTS_Submission_Date
1001	03/13/2008
1002	02/28/2008
1003	02/17/2008

Figure 9: Submitted to Online Tax System Before April 2008 Query

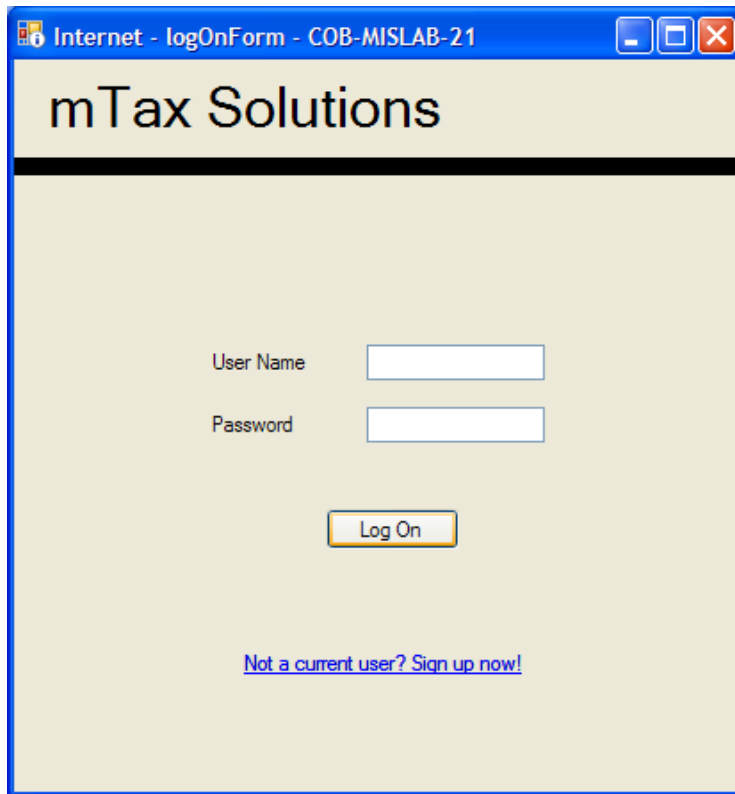
## Wireless Customer Report

User ID	Last Name	First Name	Cell Phone No	OTS Submission Date	IRS Submission Date	Confirmation No
1003	Johnson	Bob	(850) 613-6519	02/17/2008	02/22/2008	T3413947944
1002	Robinson	Lisa	(850) 549-6187	02/28/2008	03/02/2008	T2814951487
1004	Washington	Donita	(850) 319-6916	04/07/2008	04/10/2008	T4845168848
1001	Williams	Bryan	(850) 894-6515	03/13/2008	03/15/2008	T18595154871

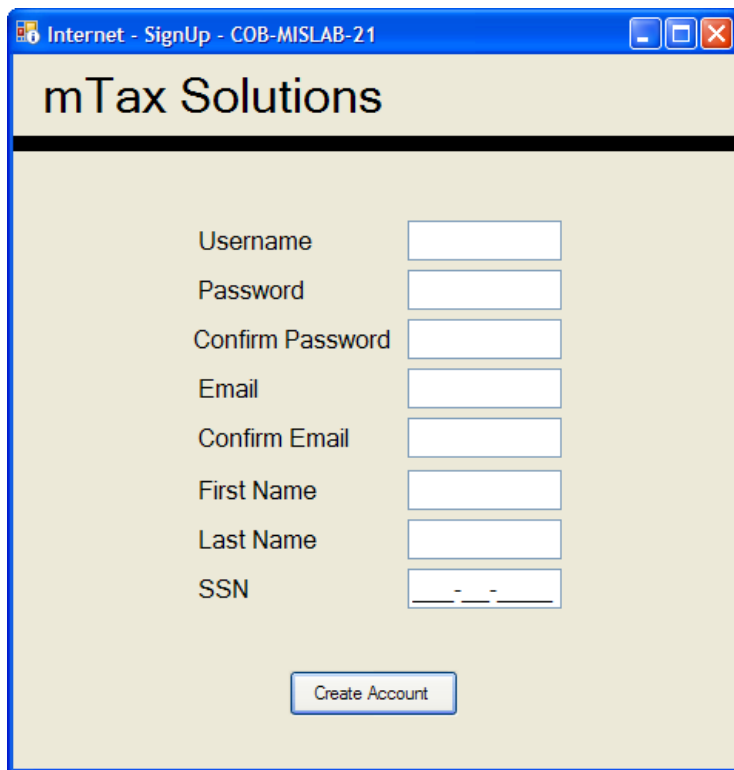
Figure 10: Wireless Customer Report

### 3.2.2 User Interface Design Using Microsoft Visual Basic

The human interface design is an important aspect of any system. Designing guidelines should be followed to ensure usability. These guidelines focus on navigational flows, design options for entering data, and even setting standard values for entered data, to name a few. Figures 11-17 illustrate the design approaches taken.



**Figure 1: Log On Window**



Internet - SignUp - COB-MISLAB-21

## mTax Solutions

Username

Password

Confirm Password

Email

Confirm Email

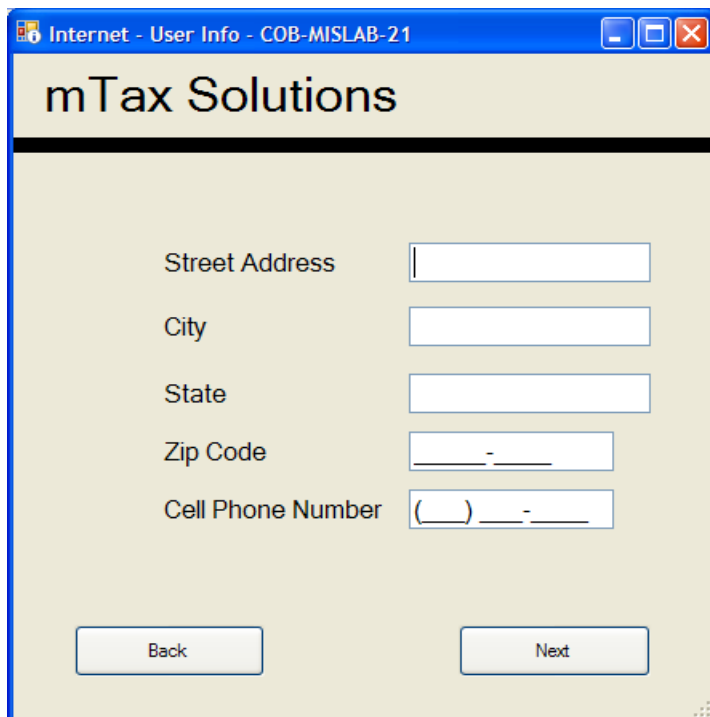
First Name

Last Name

SSN

Create Account

**Figure 2: Create Account Window**



Internet - User Info - COB-MISLAB-21

## mTax Solutions

Street Address

City

State

Zip Code

Cell Phone Number

Back Next

**Figure 3: User Information Window**



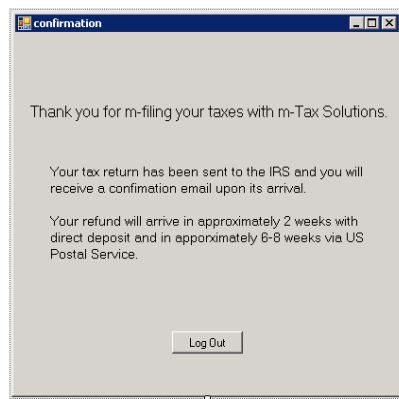
**Figure 4: Welcome Window**

 This is a screenshot of a web application window titled "TaxInfo". The window has a menu bar with "View", "Edit", and "New" options. The main content area is titled "mTax Solutions" and includes a "Log Out" button. The form is organized into two main sections: "Income" and "Payments and Tax".  
 The "Income" section contains:  
 - An input field for "Wages, salaries, and tips from box 1 on your W-2".  
 - An input field for "Taxable interest".  
 - An input field for "Unemployment Compensation".  
 - A "Calculate AGI" button.  
 - An input field for "Adjusted Gross Income".  
 - A section for dependents with the text: "If someone can claim you (or your spouse if a joint return) as a dependent, check the applicable box(es) below." followed by checkboxes for "You" and "Spouse".  
 - A section for joint returns with the text: "If no one can claim you (or your spouse if a joint return), enter \$8,350 if single, \$17,300 if married filing jointly." followed by an input field.  
 - A "Calculate Taxable Income" button.  
 The "Payments and Tax" section contains:  
 - An input field for "Federal income tax withheld from box 2 on your W-2".

**Figure 5: Tax Information Entry Window**


 A screenshot of a web application window titled "DirectDeposit". The window has a title bar with standard Windows controls. The main content area is titled "Banking Info". It contains two radio buttons under the label "Account Type": "Checking" (selected) and "Savings". Below these are two text input fields labeled "Routing Number" and "Account Number". At the bottom center is a "Submit" button.

**Figure 6: Banking Information Window**


 A screenshot of a web application window titled "confirmation". The window has a title bar with standard Windows controls. The main content area contains the following text: "Thank you for m-filing your taxes with m-Tax Solutions." followed by "Your tax return has been sent to the IRS and you will receive a confirmation email upon its arrival." and "Your refund will arrive in approximately 2 weeks with direct deposit and in approximately 6-8 weeks via US Postal Service." At the bottom center is a "Log Out" button.

**Figure 7: Submission Confirmation Window**

### ***3.3 M-Tax System Implementation***

The m-tax system was implemented using Microsoft Visual Basic.Net for the menu driven interface and Microsoft Access for the database. The user interface allows for username and password security for current users and enables new users to create a password protected account as well. When creating an account, the user is asked to create a unique username and password as well as enter in the user's email in which to facilitate contact between the user, the m-tax system, and the Internal Revenue Service. To fully ensure that the account created is protected, the user is also required to confirm the password and the email address entered.

After the user has logged in or the new user has created a new account, a screen will prompt the user to enter in a tax return for the 2008 tax year. The user will then enter in the appropriate tax information found within the tax payer's W-2 and the Form 1040 Guide. This information will allow the system to calculate the adjusted gross income, the user's taxable income, the total payment amount, and finally the refund in which the tax payer will receive.

Once the refund amount has been calculated, the user will be required to choose which method they choose to receive their refund by. If the user chooses direct deposit, they will be prompted



to enter in the banking information for either a checking or savings account. Once this information is completed and the return has been submitted, the user will receive a message stating that the return has been submitted to the IRS and they the user will receive a confirmation email upon the retrieval by the IRS. This message also states the waiting period in order to receive the refund by either the direct deposit method or by the US Postal Service method.

The Microsoft Access database holds tables that include the wireless customer's information, data on the returns that have been submitted to the IRS, and the wireless customer's banking information. The Access database also allows the user to perform queries on users that submitted their returns before April and those that have submitted form 1040. Users are also enabled to pull reports on data included in the database and access forms in order to submit new data.

A User Guide for the m-tax system was developed to show users how to use the system.

#### **4. DISCUSSION AND CONCLUSION**

The current research developed a mobile tax system by considering the usability features. It first developed a conceptual model for m-tax system, and then breakdown the m-tax information flows from this conceptual model to determine what features need to be concentrated on. The findings from the current research indicate that developing user-friendly m-tax features is crucial to the success of m-tax system development.

There are several techniques were used in developing this m-tax system. The system planning used Gantt chart in the Microsoft Project platform. In the system analysis phase, a questionnaire was developed to collect users' requirements. Data Flow Diagram and Entity-Relationship (E-R) Diagram were used to analyze these requirements in a structured way. In the system design phase, a set of E-R diagrams were mapped into a set of normalized forms to design database. The user interface design follows the guidelines provided by Valacich, George, and Hoffer (2006). The system implementation used Microsoft Visual.net to create interfaces, and Microsoft Access to create relational database.

The developed usability features in the current paper help a m-tax development company when consider distinguishing its system from its competitors, and enhance the user-friendliness for mobile taxing interfaces' design.

Unlike e-tax devices, m-tax devices have limitations including limited size, display window, processing power, and bandwidth (Tarasewich, 2003; Lee and Benbasat, 2003). The m-tax human interface design also needs to not only attract customers but also beat the distractions that are competing for the user's attention in the mobile environment (Wei & Ozok, 2005).

One limitation of the current research is that the collection of requirements was based on survey method, which is not accurate as other techniques such as simulation method. Therefore, further studies are needed on further validation of these features in m-tax environment using simulated experiments.

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