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This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

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INVENTOR(S)					
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William Ho		Chang		Vancouver, WA	
<input checked="" type="checkbox"/> Additional inventors are being named on the <u>1</u> separately numbered sheets attached hereto					
TITLE OF THE INVENTION (280 characters max)					
System, Method, Process And Apparatus For Mobile And Pervasive Output					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
<input type="checkbox"/> Customer Number		<input type="text"/>		Place Customer Number Bar Code Label here	
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<input checked="" type="checkbox"/> Firm or Individual Name		William H. Chang			
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ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification		Number of Pages <u>47</u>		<input type="checkbox"/> CD(s), Number <input type="text"/>	
<input checked="" type="checkbox"/> Drawing(s)		Number of Sheets <u>9</u>		<input checked="" type="checkbox"/> Other (specify) <u>Post Card Receipt</u>	
<input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76					
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT					
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.				FILING FEE AMOUNT (\$)	
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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
<input checked="" type="checkbox"/> No.					
<input type="checkbox"/> Yes, the name of the U.S. Government agency and the Government contract number are: _____					

Respectfully submitted,

SIGNATURE

Ying Liu

Date 11/20/00

TYPED or PRINTED NAME

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REGISTRATION NO.

(if appropriate)

Docket Number:

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FLX00P0005

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Given Name (first and middle [if any])	Family or Surname	Residence (City and either State or Foreign Country)
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Number 1 of 1

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System, Method, Process, And Apparatus For Mobile And Pervasive Output

Inventor: William Ho Chang and Ying Liu

Field of invention

5 Present invention relates to pervasive output. More particularly, it relates to system, apparatus, process, and method where an information apparatus can pervasively output digital content in its original form to an output device regardless of the processing power, display screen size and memory space of the information apparatus.

Background

10 An Information apparatus refers to both stationary computers and mobile computing devices (pervasive devices). Examples of information apparatus include, without limitation, desktops, laptops, networked computers, palmtops (hand-held computer), personal digital assistants (PDAs), Internet enabled cellular phones, smart phones, pagers, digital
15 capturing devices (e.g. digital cameras and video cameras), Internet appliances, e-books and digital or web pads. An output device may include fax machines, printers, copiers, image and/or video display devices (e.g. TV, monitors and projectors), and audio output devices. For simplicity and convenience, hereafter, we may refer to an output device as a printer and output process as printing. However, it should be understood that the term
20 printer and printing used in the discussion of present invention may refer to a specific example used to simplify description or may be one of the preferred embodiment. The definition of printer used here should be easily applied and or extended to the larger scope and definition of output devices. In no way this should be construed as restricting the scope and practice of present invention.

25 Fueled by an ever-increasing bandwidth, processing power, wireless mobile devices and available software applications for pervasive devices, millions if not billions of users are or will be creating, downloading, and transmitting content and information using their pervasive computing devices or information apparatus. As a result, there is a need to allow
30 users to easily output content and information from their pervasive computing devices (information apparatus) to any output device. People need to output directly and conveniently from their pervasive information apparatus, without depending on

synchronizing with a stationary PC for printing as an example.

To illustrate, an information worker at an airport, receiving Email in his hand-held computer (information apparatus) may want to walk up to a nearby printer or fax machine to have his e-mail printed. In addition, the mobile worker may also want to print a copy of his to do list, appointment book, business card, and his flight schedule from his mobile devices. As another example, a user reading a news article using his/her Internet-enabled pager or mobile phone may want to print out the complete article instead of reading it through the small screen on his pager or mobile device. Still, a user visiting an e-commerce site using his cellular phone may want to print out pictures of the product he/she is buying. Such pictures may not be displayed on the small screen of his/her cellular phone. Yet in another example, a user with a digital camera after taking a picture may want to easily print it out to a nearby printer. Yet another example, a user may want to simply walk up to a printer with a mobile device and conveniently prints his/her PowerPoint, Word document, PDF, HTML, JPEG etc. stored in his/her mobile device or in a network (e.g. Internet, corporate network). In addition, a user should also be able to print a web page or a book published on the Internet.

Conventionally, output device (e.g. printer) is connected to information apparatus via wired connection such as through a cable line. A wireless connection is also possible by using, for example, radio communication or infrared communication. Regardless of wired or wireless connection, a user must first install in his/her information apparatus a printer driver corresponding to a particular printer model and make. Using a device dependent or specific driver, the user's information apparatus may process output content or digital document into the printer's input space. Printer's input space corresponds to the type of input that a printer understands (here on refer to print data). For example, printer's input space or print data may include printer specific input format (e.g. image, graphics, file, data format), encoding, page description language, markup language, instructions, protocols or data that can be understood or used by a particular printer make and model. Print data may be proprietary or published or combination. Printer's input space or print data is therefore, in general, device dependent. Different printer model may specify its own input, designed or

adopted for optimal operation by the printer manufacturer according to a specification. Consequently, different printer usually requires using its own specific printer driver for accurate printing. A device driver (printer driver in this example) may control, manage, communicate, and output print data to a printer. Sometimes, instead of using a printer or
5 device driver, the device driving feature may be included or as part of an application software.

Installation of a printer driver or application may be accomplished by, for example, installing manually using CD or floppy disk supplied by the printer manufacturer. Or alternatively, a
10 user may be able to download that particular driver or application from a network. For a home or office user, this installation process may take anywhere from several minutes to several hours depending on the type of driver and user's sophistication level with computing devices and networks. Even with plug and play driver installation, it still requires the user to execute multiple-step process for each printer. Nevertheless, this installation
15 and configuration process is adding undoubtedly a degree of complexity and work to end-user who may otherwise spend their time doing other productive or enjoyable work. Moreover, many unsophisticated users may be discouraged from adding new peripherals (e.g. printers, scanners) to his home computer or network only to avoid the hassle of installation and configuration. Therefore, there is a need to provide a method where a user
20 can more conveniently or easily output digital content to an output device without the inconvenience of finding and installing a new printer driver.

Conventional printing method may pose significantly higher challenge and difficulty for mobile device users than for home and office users. The requirement for pre-installation of
25 device-dependent driver is in conflict with the concept of pervasive computing and output. For example, a mobile user may want to print his e-mail, PowerPoint, web page, or other document at airport, in airplane, gas station, convenient store, kiosk, hotel, conference room, office, and at home. It is highly unlikely that the user finds at each of these locations printer of the same make and model. It is usually not a viable option to pre-install all
30 possible (hundreds if not thousands of) printer drivers in the user's information apparatus. The user may have to install and configure a printer driver each time at each of these locations before printing. Moreover, the user may not want to be bothered with looking for

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