A Study on integrated location system in house

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With the development of information technology, IoT has been gaining attention as a means of providing communication functions to various things existing in the world, and connecting to a network for automatic control and the like. As a part of that, various household appliances and equipment in the home have advanced function, and things capable of network connection have become popular. As network connection became possible, household appliances and equipment can communicate with and cooperate with various other devices, acquire and provide various information, and as a part of it, It will be possible to know location of users. In addition, there are a variety of users with different age, gender and household position in the home, and it is necessary for home electronics and appliances to provide services according to the state of those users in the previous research . Therefore, home electronics and devices in the home using the position information need to know not only the position of the user but also the identification information of the user who the user is specifically. GPS (Global Positioning System) has become a standard as a method of positioning, but there is a disadvantage that GPS positioning can not be performed indoors such as in a home. Also, in the case of indoors, it is necessary to measure the location such as where indoors are located, so it is necessary to use a position measurement method for indoor use only. So far, various position measurement methods for indoor use have been devised variously, and roughly they detect a user by detecting a device to a user possessing a specific device by a reader for that device A method, and a method of detecting a user by a sensor and positioning the position. Generally, the former can only measure the user who owns the device, but because the ID is assigned to the device, the user can easily identify someone. In the latter case, the user does not need to possess the device, and it is possible to detect to all users, but it is difficult to identify the user. In this research, we propose a location information integration system that can prepare multiple indoor position location methods, collect and integrate detected user location information in each location, and derive more accurate location information of one user We propose and implement technologies that can provide the location information of the user obtained by the user to the in-home service platform or applications. Specifically, a variety of indoor position detection methods are installed indoors, a variety of installed position detection methods perform position detection, and the obtained result is sent to the position information integration system. The position information integration system receives position detection results transmitted from each

position detection method, integrates these data, and derives one piece of position information. After that, the location information integration system outputs the derived location information and aims to provide it for home service platforms and applications. As a design of the location information integration system, APIs for converting data between various location detection methods and integrated systems to be used, integrated systems, and domestic applications are provided. In addition, LocationData is set as the data structure in the position information integration system, Convexhull concept is used as indication of which area the user is roughly indoors, and for data integration, the union of this Convexhull, the difference set It was realized in a form to take. To improve reliability, we also implemented a function to infer users about the system. As the final output of the system, it is outputted in six levels of precision according to the data after integration. In this research, we implemented RFID, human sensor and camera sensor as a position detection method to be introduced, and implemented an integrated system including the data delivery method from them. Finally, as an experiment, we aimed to compare the output after changing the number of position detection methods to be used, and to see the operation about the designed user inference function. As a result, it can be confirmed that more accurate output can be obtained when using multiple LSs than using LS alone, and that the user inference function is also correctly operated, and indoor position detection by combining methods, it is possible to obtain more reliable information by covering the drawbacks of each position detection method.