Development of the cloud gathering system of seismic records utilizing the smartphone seismometer network

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There are more than 5,000 strong motion seismometer observation stations in Japan as typified by the K-NET, KiK-net. These seismic observation networks have been maintained for approximately 20 years, and these records have been greatly contributed to developments of the seismology and engineering.

Such densely seismometers covering whole country cannot be seen in any other countries, but it is not enough for recording regional and residential earthquake responses. However, it is difficult to increase these strong-motion seismometers exponentially in terms of costs. So, we have been developing the citizen seismometer network by utilizing MEMS acceleration sensors inside mobile terminals. Only by installing apps, soon after the earthquake occurs, these terminals can record waveform, then data are automatically transmitted to the cloud server via internet. Soon after that, users can easily access the distribution map of seismic intensities, and analysis data by only use of a web browser.

By this system, citizens who have no experience of analyzing seismic data can install their own seismometers in their houses and they can compare waves recorded in another buildings from the standpoint of amplitude or predominant frequency.

In the future, we are going to develop the gathering system recorded by mobile terminals including the other type of mobile devices or photographic images, and also we are going to develop analyzing techniques with machine learning methods (Fig.1).

Finally, we think it have good reason to develop these systems as the social implementation. So, it is crucial to cooperate with experimental partner including local governments, companies, citizens, and also researchers from overseas.
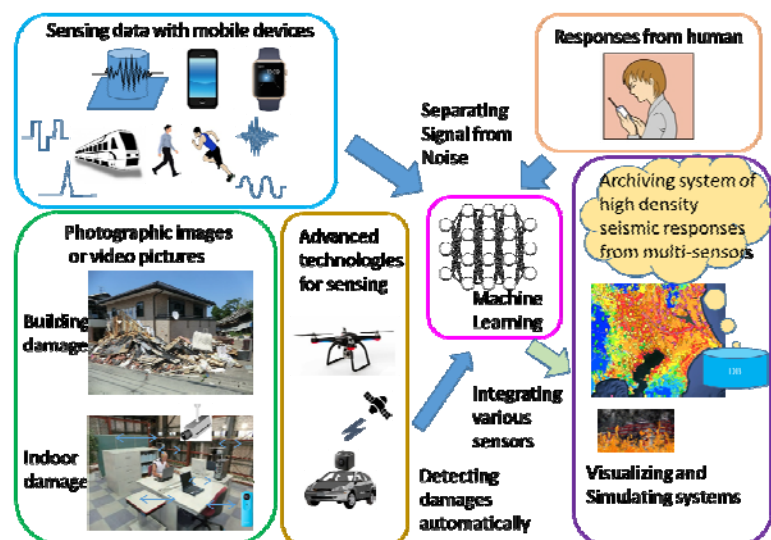

Fig.1 Future development of the cloud gathering system