Integration of speech recognition into Air Traffic Control

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1. ABSTRACT

We study here the feasibility and relevance of integrating speech recognition technologies into air traffic controller workstations, with the purpose of adding safety and reduce workload, while the expected growth of air traffic density tends to add more constraints and stress to these critical jobs.

The study starts by grouping several speech recognition engines of the market and benchmarking them in the context of recognition of communications from controllers to aircraft pilots. The results for this benchmark show that although no engine is reliable enough to allow its use in an operational context, the building of a consensus over the different benchmarked engines may lead to a more reliable recognition process.

These engines are thus integrated into a distributed architecture that acts quite like a speech recognition engine itself. It takes on controlling the engines and gathering their results, and builds a consensus result on the top of them with a confidence score expressing its reliability *a priori.*

We run then a second benchmark, still in the context of controller communications, with the aim to compare the behavior of the "consensus" engine over the original engines'. This benchmark shows that although 100% reliability still cannot be achieved, the consensus engine makes it possible to control a trade-off between the response rate of the system and the reliability of its results.

Finally, the system is integrated into a mockup of a controller workstation interface. Several concepts are implemented, making speech recognition technologies a support for the controller's repetitive work, allowing him to perform common actions faster and to get additional safety over his actions, while still being at the center of the decision loop.