Press release

Bridge inspection using UAVs: Possibilities and limitations

(Athens, January 2021) Unmanned Aerial Vehicles (UAVs), commonly known as drones, nowadays, come at a relative low cost and can be equipped with high end sensors. Thus, it is no surprise that drones are widely used in multiple fields, daily. In particular, UAVs are becoming mainstream in power grid or highway inspection[1]. Bridges is another scenario, in which drone inspection can be both time efficient and cost effective.

Back in April 2019, Mississippi's governor, Phil Bryant, was forced by the Federal Highway Administration (FHWA) to close eighty-three city and country bridges, due to their poor condition[2]. Closure costs are only a small fraction; bridge maintenance and replacement should be considered. At the end, these costs are passed to citizens, affecting the level of the taxes.

Today, bridge inspection is primarily a manual job, requiring both human and equipment resources and exposing workers into certain safety risks. The main challenge rises when operators have to extend beneath the bridge and to the top of the structure, leaving some parts of the bridge not assessable[3].

At this point, UAVs' usefulness becomes apparent. Yet, there are limitations. Components' fatigue (e.g. rotors) may lead to failure (crash). Power supply is another problem since greater capacity comes with more weight. UAVs face significant limitations depending on the weather conditions and mission payload. Recall that an inspection require multiple sensors like RGB or thermal cameras, or other tools[4].

The EU funded PANOPTIS project, employs different kinds of machine learning approaches, to support the monitoring of large-scale bridge infrastructures. These systems allow access to multiple channels of information, which can be used to estimate the current bridge condition status and provide feedback to users and operators. Such information can be used for adjusting the condition of bridges.

Additional information can be found in PANOPTIS site, just follow the link: http://www.panoptis.eu/.

[1] Darby, Paul, William Hollerman, and John Miller. "Exploring the Potential Utility of Unmanned Aerial Vehicles for Practical Bridge Inspection in Louisiana." MATEC Web of Conferences. Vol. 271. EDP Sciences, 2019.
[2] Wilson, B. (2018). Still in a lot of Danger. Roads & Bridges, May 2018
[3] Begnaud, J. (2017). Unpublished Interview, Louisiana Department of Transportation and Development, Lafayette District, with Mr. Jerry Begnaud, District Bridge Engineer, August 2017.
[4] Park, K., & Ewing, R. (2017). The usability of unmanned aerial vehicles (UAVs) for measuring park-based physical activity. Landscape and Urban Planning, 167, 157-164.

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