

**Thesis Abstract cohort 2011-2013**  
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**Combining Volume Sensors with Multi-Modal Video Analysis for Fire Detection and Forecasting**

Insufficient lighting, steam, and dust, among others, lead to nuisance alarms or malfunctioning of the algorithms in Video Fire Detection (VFD) systems. Additionally to the problems related to detection, false alarms in VFD affect the retrieval of valuable video based information about the fire scene used for fire forecasting. Such information includes the smoke layer height and the fire location. By combining VFD with volume sensors a complementary, "multi sensor" system is created, reducing nuisance alarms and missed detections by the video systems and even decreasing their computational cost. This work starts with a literary review on VFD and nuisance alarms, focusing on nuisance in video detection. This is followed by a description of the volume sensors used, of how the system is created, and of how the respective readings are integrated. For localizing the fire with the volume sensors a 2 dimensional mesh is introduced, whereas for the measurement of the smoke layer height a linear array (of sensors) is implemented. Then, two experiments carried out in a closed, empty car park are described, in which the volume sensor systems were used with different fires and setups. Finally, the results of the experiments are presented and discussed.

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