Application of computer vision in studying fire plume behavior of tilting flames AMIRHESSAM AMINFAR, JEANETTE COBIAN IIGUEZ , STEPHANIE PHAM , Univ of California - Riverside, JOEY CHONG, GLORIA BURKE, DAVID WEISE, USDA Forest Service, MARKO PRINCEVAC, Univ of California - Riverside — With the development in computer sciences especially in the field of computer vision, image processing has become an inevitable part of flow visualization. Computer vision can be used to visualize flow structure and to quantify its properties. We used a computer vision algorithm to study fire plume tilting when the fire is interacting with a solid wall. As the fire propagates to the wall the amount of air available for the fire to consume will decrease on the wall side. Therefore, the fire will start tilting towards the wall. Aspen wood was used for the fuel source and various configurations of the fuel were investigated. The plume behavior was captured using a digital camera. In the post processing, the flames were isolated from the image by using edge detection technics, making it possible to develop an algorithm to calculate flame height and flame orientation. Moreover, by using an optical flow algorithm we were able to calculate the speed associated with the edges of the flame which is related to the flame propagation speed and effective vertical velocity of the flame. The results demonstrated that as the size of the flame was increasing, the flames started tilting towards the wall. Leading to the conclusion that there should be a critical area of fire in which the flames start to tilt. Also, the algorithm made it possible to calculate a critical distance in which the flame will start orienting towards the wall

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