Povzetek

Robotika v rojih, s tujko ''Swarm Robotics'', je veja robotike, ki se ukvarja s proučevanjem algoritmov preprostih robotov, delujočih v skupinah. Namen moje raziskovalne naloge je bil ugotoviti, ali že najmanjša medsebojna komunikacija med roboti vpliva na učinkovitost delovanja le-teh in ali ti roboti kažejo oblike vedenja roja.

V uvodnem delu raziskovalne naloge je na kratko opisanih nekaj primerov »skupinskih« robotov, ki so jih raziskovalci razvili za opravljanje različnih nalog; od najbolj enostavnih, ki urejajo in razvrščajo predmete, do zelo zahtevnih, ki naj bi lahko nadomestili človeka pri delu v nevarnih okoljih. V nadaljevanju je opisan načrt eksperimenta ter opis konstrukcije in delovanja testnih robotov. V slikah je predstavljenih in opisanih nekaj naključnih dogodkov med delovanjem robotkov.

V zaključku so rezultati mojih merjenj in opazovanj, ki so potrdila zastavljene cilje in hipoteze, v katerih sem predvidevala, da medsebojna komunikacija vpliva na učinkovitost delovanja – enostavni roboti, ki se sporazumevajo, delujejo bolje kot tisti, ki se ne sporazumevajo, sodelovanje med njimi pa je bilo mogoče opaziti.

Abstract

Swarm robotics is an approach to collective robotics which researches algorithms of simple robots that operate in groups. The aim of my research was to ascertain if the least communication between the robots has any effect upon the robots' working efficiency and whether these robots show any of the collective behavior.

The first part of this article describes some practical examples where these robots were developed by the scientists in order to perform various tasks; from the simplest ones, where robots sort out and cluster objects, to the more difficult ones, where robots try to substitute a human to work in dangerous situations. The continuation of the experiment describes robot's construction and robot's behavior. In addition, some randomly selected robots' work is illustrated.

The research concludes with measurements and observations, which have confirmed my goals and hypothesis, in which I foresee that even the least communication between the robots influences on the robot's working efficiency – simple robots that communicate among each other work better than those robots which have no ability to communicate to each other. Furthermore, robots' collaboration has also been detected.