Umsókn: 196130-0091

1.1 Umsjónarmaður

Kennitala	0309725469	Nafn	Hannes Högni Vilhjálmsson
Heimilisfang	Seilugranda 4	Póstnúmer	107
Simi	618 6323	Tölvupóstfang	hannes@ru.is
Kyn	Karlkyns	Síðasta prófgráða	Doktorsgráða / eða sambærilegt
Vinnustaður	Háskólinn í Reykjavík		
Sérsvið	Interactive virtual environments and virtual reality, avatars and agents in networked environments, game development for education and training, natural human-computer interaction, embodied conversational agents, social and linguistic behavior modeling and simulation, real-time graphical visualization		
Tegund aðseturs	Háskóli		
Heiti/svið/deild (tegund?)	Socially Expressive Computing group the Center for Analysis and Design of Intelligent Agents (Gervigreindarsetur HR)		
Starfsheiti	Associate Professor (Dósent)		
Hvernig tengist verkefni nemanda viðfangsefnum umsjónarmanns?	Supervisor leads the Socially Expressive Computing group, where social simulation is a central part of the ongoing research.		
Umsjónarhlutfall	50%		

Kennitala	2404803799	Nafn	Claudio Pedica
Heimilisfang	Hringbraut 115	Póstnúmer	101
Simi	868 3756	Tölvupóstfang	claudio@ru.is
Kyn	Karlkyns	Síðasta prófgráða	Mastersgráða / eða sambærilegt
Vinnustaður	Háskólinn í Reykjavík		
Sérsvið	Social modeling, simulation and visualization, user experience and interaction design, digital installations and human environment interaction.		
Tegund aðseturs	Háskóli		
Heiti/svið/deild (tegund?)	Socially Expressive Computing group the Center for Analysis and Design of Intelligent Agents (Gervigreindarsetur HR)		
Starfsheiti	Affiliated Researcher		
Hvernig tengist verkefni nemanda viðfangsefnum umsjónarmanns?	Supervisor has been advancing the field of social simulation over the last decade, and this project will open possibilities for brand new applications in Iceland.		
Umsjónarhlutfall	50%		

1.2 Fyrri styrkir umsjónarmanns úr NSN

Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2011
Verkefni	Betra samspil huga og leiks í hugþjálfunarleikjum með hjálp eðlisfræði og sáleðlisfræði		
Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2011
Verkefni	Vefviðmót til að nýta og notendaprófa gagnvirkar sýndarverur		
Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2011
Verkefni	Sjálfsprottnar sýndarsögur		
Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2011
Verkefni	PC/Mac hugþjálfunartölvuleikur til að bæta einbeitingu barna.		
Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2012
Verkefni	Gagnvirk þrívíðarhermun mannlífs í miðbæ Reykjavíkur		
Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2013
Verkefni	Þróun á kerfi sem lærir inn á hegðunarmynstur notenda		
Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2013
Verkefni	Notkun GPS gagna hjólreiðamanna við bestun hjólreiðastíga		
Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2014
Verkefni	Áhrif leiðtogahlutverks á sjónrænt félagslegt atferli mannlegra vitvera		
Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2016
Verkefni	Sjálfvirkni í aðgreindum kennsluæfingum		
Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2016
Verkefni	Framköllun fælniviðbragðs með sýndarveruleika		
Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2016
Verkefni	Sýndarveruleiki sem þjálfunartæki fyrir sérkennslukennara		
Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2017
Verkefni	Frammistaða nemenda aukin með gagnvirkum kennsluhugbúnaði og lífeðlisfræðilegum mælingum.		
Umsjónarmaður	Hannes Högni Vilhjálmsson	Ár	2018
Verkefni	Sýndarveruleiki til þjálfunar félagsfærni hjá börnum með einhverfu		

1.3 Aðrir styrkir umsjónarmanns vegna þessa verkefnis

Umsjónarmaður	
Upphæð (kr.)	
Hvaðan	
Til hvaða þátta	

1.4 Nemandi

Kennitala	0	Nafn	TBD
Heimilisfang		Póstnúmer	
Sími		Tölvupóstfang	
Kyn		Núverandi nám	
Fjöldi mannmánaða fyrir þennan nema	3		
Bakkalársgráða / eða sambærilegt			
Nám (fagsvið)		Einkunn	
Einingafjölda lokið		Háskóli	
Svið/deild		Upphaf náms	
		Lok náms	
Mastersgráða / eða sambærilegt			
Nám (fagsvið)		Einkunn	
Einingafjölda lokið		Háskóli	
Svið/deild		Upphaf náms	
		Lok náms	
Annað			
Nám (fagsvið)		Einkunn	
Einingafjölda lokið		Háskóli	
Svið/deild		Upphaf náms	
		Lok náms	
Kennitala	0	Nafn	TBD
Heimilisfang		Póstnúmer	
Sími		Tölvupóstfang	
Kyn		Núverandi nám	

Fjöldi mannmánaða fyrir þennan nema	3	
Bakkalársgráða / eða sambærilegt		
Nám (fagsvið)		Einkunn
Einingafjölda lokið		Háskóli
Svið/deild		Upphaf náms
		Lok náms
Mastersgráða / eða sambærilegt		
Nám (fagsvið)		Einkunn
Einingafjölda lokið		Háskóli
Svið/deild		Upphaf náms
		Lok náms
Annað		
Nám (fagsvið)		Einkunn
Einingafjölda lokið		Háskóli
Svið/deild		Upphaf náms
		Lok náms

1.5 Fyrri styrkir nemanda úr NSN

Nemandi	
Ár	
Heiti verkefnis	

1.6 Aðrir styrkir nemanda vegna þessa verkefnis

Nemandi	
Upphæð (kr.)	
Hvaðan	
Til hvaða þátta	

2.1 Verkefni

Heiti á íslensku	Hermt eftir flæði og upplifun ferðamanna til byggja upp betri ferðamannastaði
Heiti á ensku	Simulating the Flow and Experience of Tourists for Planning Better Tourist Infrastructure

Útdráttur til birtingar	Tourists arrive in Iceland in greater numbers than ever before. The infrastructure of national parks and natural areas needs to be extended to accommodate this larger wave of visitors. Extension of infrastructure is already planned for Þingvellir and future designs are in evaluation for Jökulsárlón. In this project, we propose the construction of a tool, built on our previous research on artificially intelligent agents and territoriality, to simulate the flow and experiences of people visiting a tourist site. Using the tool, stakeholders can try out different scenarios to see the potential impact of infrastructure changes and help them make informed decisions. The project will compare simulation outcomes to actual data gathered at certain sites. The first scenario will be done in collaboration with Þingvellir National Park.

Efnisorð á íslensku (1)	Ferðamenn	Efnisorð á íslensku (2)	Hermun
Efnisorð á íslensku (3)	Innviðir	Efnisorð á íslensku (4)	Gervigreind
Efnisorð á íslensku (5)	Verkfæri	Efnisorð á íslensku (5)	Verkfæri
Efnisorð á ensku (1)	Tourists	Efnisorð á ensku (2)	Simulation
Efnisorð á ensku (3)	Infrastucture	Efnisorð á ensku (4)	Artificial Intelligence
Efnisorð á ensku (5)	Tool	Fagsvið	VERKFRÆÐI, TÆKNIVÍSINDI OG RAUNVÍSINDI
Ef óskað er eftir að umsókn sé metin í fleiri en einu fagráði tilgreinið fagsvið og rökstyðjið			
Hvar á landinu verður verkefnið aðallega unnið?	Höfuðborgarsvæðið		

2.2 Lýsing á verkefninu

Lýsing á verkefni í hnotskurn	People come to Iceland to visit the land, in greater numbers than ever before. The infrastructure of national parks and natural areas need to be extended to accommodate this larger wave of visitors. Extension of infrastructure is already planned for Þingvellir and future designs are in evaluation for Jökulsárlón. Both areas, unique in the world, are going to have an estimated 1.5M visitors per year. Such high numbers require attentive considerations in the planning of visitors centers, parking areas and general infrastructures for visitors attendance. The problem is complex because the infrastructure needs to accommodate and route a certain high number of visitors per day and doing so while preserving nature as much as possible. The challenge is to manage the popularity of a protected area without loosing its true authenticity which is foundational of its intrinsic values, both cultural and economical. Because of the dynamics and mutual influence between types of visitors and infrastructures, the challenge of managing the popularity of a naturalistic area while preserving it is so complex that stakeholders lack the capacity to thoroughly investigate the consequences of certain decisions. This project proposes building a tool based on artificial intelligence and social simulation, which will allow decision makers to visualize the plausible consequences of the planning of new infrastructures for highly visited naturalistic areas. The idea is to support the problem-solving process in such a way that managers can reach a consensus on better solutions to preserve the authenticity of a naturalistic area without preventing people from visiting the site.

Nýsköpunargildi verkefnis	Authenticity is an experiential quality of a place such as a national park. It qualifies and sums up a human experience of genuineness (or lack thereof) in visiting an area. Authenticity is hard to measure accurately and fully, it's dependent from several factors which might be interconnected creating a landscape of potential consequences which are difficult to navigate without a form of compass. The software tool proposed here will be the first tool of its kind to support decision makers by providing orientation clues into the complex matters of authenticity. For naturalistic area which are highly popular we know that authenticity is diminished by the perception of crowding, that is the perception of being surrounded by "more people than nature". The purest experience of a naturalistic area, especially the more wild areas like the one which are common in Iceland, is an experience of solitude where someone can have an intimate encounter with nature itself.
Markmið og hagnýtt gildi	We envision a technology that helps decision makers to reach a consensus on balanced solutions to better preserve naturalistic areas, patrimony of the country of Iceland and the world. The technology incarnates into a software tool that synthesizes photogrammetry, space analysis, artificial intelligence and simulation to allow decision makers to speculatively investigate plausible scenarios of intervention on the infrastructure of an area. The software augments the ability of the stakeholders to look into the complex phenomena of the visitors flow and crowding, so that they can take the wisest decisions to manage the popularity of an area while preserving its authenticity. The simulation software might find immediate application to those scenarios where new tourist infrastructures are under planning. Discussions with Thingvellir National Park and Jökulsárlón future Visitor Center are already undergoing. We will use those first test scenarios to calibrate and validate the approach, by also collecting data on real tourist traffic. In the case of Thingvellir we plan to use available monitoring data to calibrate the simulation model to adhere to real flow of visitors in the park. Thingvellir National Park has more than one year of monitoring data that, upon permission, we plan to use to inform and design a machine learning algorithm that to fit the simulation model of virtual visitors flow with the real phenomenon of people visiting Thingvellir during summer and winter.
Þáttur námsmanns / námsmanna	The students will be responsible for: 1. researching existing machine learning approaches to calibrate crowd simulation models; 2. proposing a solution to the problem that can fit into an existing spatial analysis tool and the type of data available at Thingvellir; 3. implementing the solution in the spatial analysis tool; 4. running a questionnaire on location to measure the level of perceived disturbance due to crowding in Thingvellir; 5. test the results of the questionnaire against the output of the implemented solution; 6. document the results of the investigation in the form of a research paper. The work will be split up among two students. One working on the machine learning and the other on the evaluation of the visitors' experience at the park. Ideally the students will come from different background and work together in the spirit of an interdisciplinary collaboration. Possible, but not guaranteed, the possibility to collaborate with other researchers at the University of Iceland.
Þáttur umsjónarmanns / umsjónarmanna	The supervisors will assist with defining objectives and working out the plan of approach. They will provide expert knowledge in the areas of social and territorial simulation, as well as simulation visualization and analysis. They will monitor the progress and evaluate the results. Finally, they will connect the students to the larger community of collaborators and researchers.
Verk- og tímaáætlun	Week 1-2: Get familiar with the existing simulation platform and research simulation of tourist behavior. Read up on territoriality and authenticity of experience research. Week 3-6: Extending the platform with tourist behavior for a first scenario at Thingvellir National Park. week 7-10: Several iterations of (a) suggesting specific agent decision influences (b) implement influences in model and (c) run simulation and evaluate results in comparison with real data. week 11-12: Demonstrate and discuss results with stakeholders, evaluate potential and future development.

Fyrirhuguð birting eða kynning á niðurstöðum	Primarily the results will be communicated to the Thingvelir National Park administration as we discuss potential for further research and possible incorporation of results into their planning processes. In addition, a demonstration of a working technical solution will be added to the repertoire of technical demos showcasing our platform. Those demos reach a variety of people, from research collaborators to the general public at events such as AI Festival and UT Messan. Depending on how successful the student is, the project could get featured in a workshop or conference paper at venues such as the International Conference on Intelligent Virtual Agents.
Aðferðarfræði	The methodology follows standard practice in technical innovation. The students first need to gain an understanding of the problem by reading relevant literature as suggested by the supervisors. They will do further background research, mainly into models for autonomous agents and authenticity of experience. Based on this background research, the students will propose and iterate over solution that are refined with the support of the supervisors. At each iteration the results are evaluated.

2.3 Samstarf og mótframlag

Heiti samstarfsaðila	Þjóðgarðurinn á Þingvöllum	Aðsetur	Selfoss
Skýring á samstarfi og mótframlagi	Interest in exploring the potential of using simulation to help plan new infrastructure. Providing 3D model of the national park, along with information about possible infrastructure changes that can be modeled and simulated. Providing monitoring data from devices that track tourists. Help with evaluating results of simulation and applicability to their decision process.		