1.	Record Nr.	UNINA9910847154703321
	Autore	Paaß Gerhard
	Titolo	Foundation Models for Natural Language Processing : Pre-trained Language Models Integrating Media / / by Gerhard Paaß, Sven Giesselbach
	Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2023
	ISBN	9783031231902 3031231902
	Edizione	[1st ed. 2023.]
	Descrizione fisica	1 online resource
	Collana	Artificial Intelligence: Foundations, Theory, and Algorithms, , 2365-306X
	Classificazione	COM004000COM025000COM073000LAN009000
	Altri autori (Persone)	GiesselbachSven
	Disciplina	006.35
	Soggetti	Natural language processing (Computer science) Computational linguistics Artificial intelligence Expert systems (Computer science) Machine learning Natural Language Processing (NLP) Computational Linguistics Artificial Intelligence Knowledge Based Systems Machine Learning
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Nota di contenuto	1. Introduction -- 2. Pre-trained Language Models -- 3. Improving Pre-trained Language Models -- 4. Knowledge Acquired by Foundation Models -- 5. Foundation Models for Information Extraction -- 6. Foundation Models for Text Generation -- 7. Foundation Models for Speech, Images, Videos, and Control -- 8. Summary and Outlook.
	Sommario/riassunto	This open access book provides a comprehensive overview of the state of the art in research and applications of Foundation Models and is intended for readers familiar with basic Natural Language Processing (NLP) concepts. Over the recent years, a revolutionary new paradigm has been developed for training models for NLP. These models are first

pre-trained on large collections of text documents to acquire general syntactic knowledge and semantic information. Then, they are fine-tuned for specific tasks, which they can often solve with superhuman accuracy. When the models are large enough, they can be instructed by prompts to solve new tasks without any fine-tuning. Moreover, they can be applied to a wide range of different media and problem domains, ranging from image and video processing to robot control learning. Because they provide a blueprint for solving many tasks in artificial intelligence, they have been called Foundation Models. After a brief introduction tobasic NLP models the main pre-trained language models BERT, GPT and sequence-to-sequence transformer are described, as well as the concepts of self-attention and context-sensitive embedding. Then, different approaches to improving these models are discussed, such as expanding the pre-training criteria, increasing the length of input texts, or including extra knowledge. An overview of the best-performing models for about twenty application areas is then presented, e.g., question answering, translation, story generation, dialog systems, generating images from text, etc. For each application area, the strengths and weaknesses of current models are discussed, and an outlook on further developments is given. In addition, links are provided to freely available program code. A concluding chapter summarizes the economic opportunities, mitigation of risks, and potential developments of AI.